BELL TELEPHONE QUARTERLY

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OCTOBER, 1930

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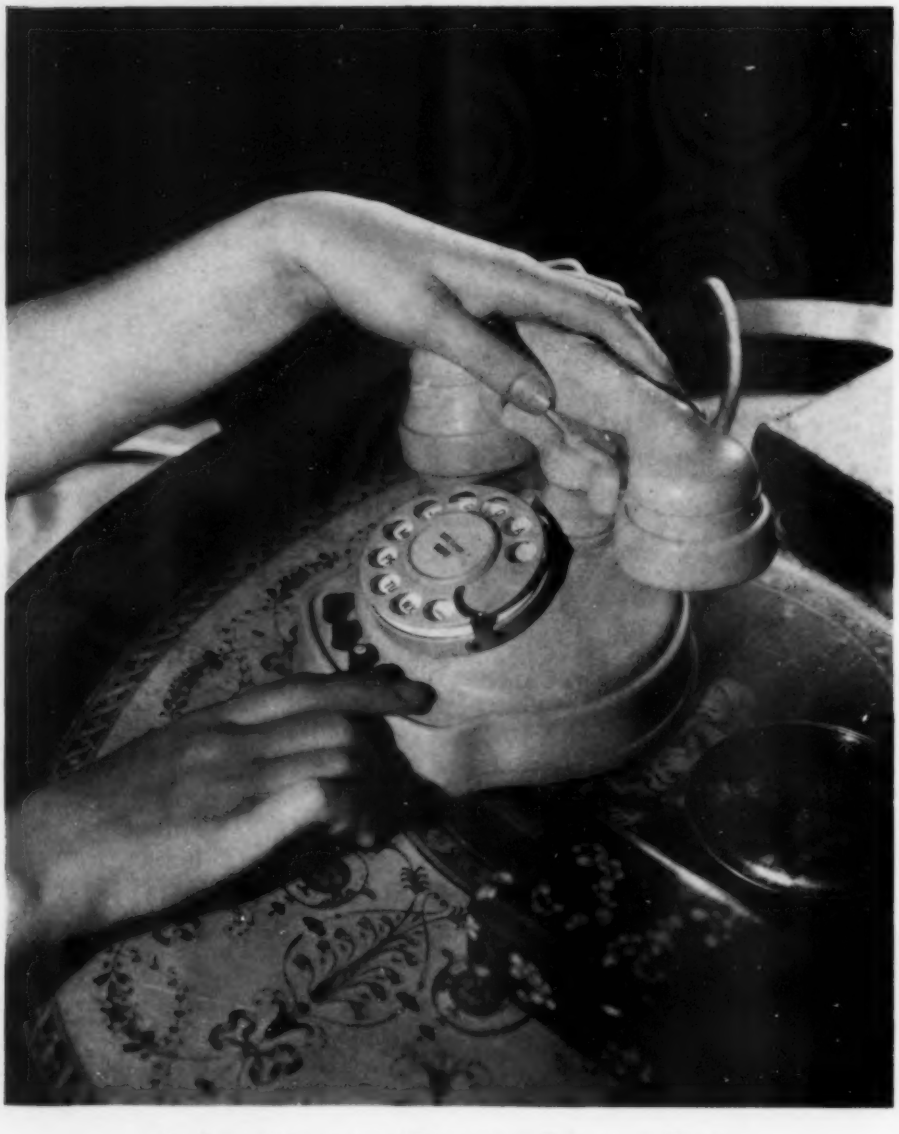

AN INTERCOMMUNICATING SYSTEM FOR HOMES AND OFFICES.

FIGURE 1. Push Buttons on the Instrument for Establishing Connections. (See page 270.)

BELL TELEPHONE QUARTERLY

A Medium of Suggestion and a Record of Progress

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International Co-operation in Telephony

UNTIL recent years international telephony has not constituted a major problem for the Bell System. The United States covers such a large continental area that the great bulk of telephone toll business of the System has been wholly within the United States. Until the placing of the Cuba cables in 1921 the only foreign connections were to Canada with whose telephone administrations, particularly the Bell Telephone Company of Canada, the working relations of the Bell System have been so close that to a large extent these connections offer no special problems.

In Europe, however, international telephony has naturally assumed a far greater importance. The division of Europe into 35 independent nations for the most part relatively small in area; the large population and the high industrial and commercial development; the existence of large centers not far apart but in separate countries and often separated by intervening countries; all these facts have naturally resulted in a great field for international telephone communications. Furthermore the fact that the telephone systems in the different countries, to a large extent, developed independently of each other, naturally led to wide differences in plant, traffic and commercial practices in the different systems.

Success in international telephone service, of course, requires the closest co-ordination of practices between the telephone administrations involved. This includes agreement upon types of service to be offered to customers, and upon methods and practices to be used by commercial and traffic forces. It includes adoption of similar standards of plant design and construction, and co-ordination of the construction and maintenance programs. In short, it is necessary to work out between the administrations involved, mutual agreement upon the details of telephone plant and methods of handling service in so far as they react on the international business.

In Europe the difficulties arising from divided control of the international business are accentuated by the number of different countries involved, the large number of different international connections and by differences in language and to some extent of commercial interest in the different countries. It is natural, therefore, that for a long time the necessity for some type of formal co-operation in telephone matters between the European countries had been recognized.

The first co-operation of this type was carried out through the medium of the International Telegraph Union. This organization was established in 1865 by a treaty between the European nations and a number of other nations of the world for the purpose of establishing a basis for international co-operation in telegraphy between nations in which the telegraph systems are owned and operated by the government. As early as 1885 some items relating to telephony were included in a revision of the service regulations for telegraphy agreed to by the members of the International Telegraph Union. With successive revisions of these regulations the telephone items gradually increased covering such fundamental matters as types of service to be offered, unit period of conversation and priority for different classes of calls.

The regulations of the International Telegraph Union, however, are in the nature of a treaty between the various nations adhering to the Union, and revisions of these regulations took place at intervals usually of between 5 and 10 years. The regulations were relatively restricted in scope. Under this arrangement there was not the continuous and informal contact desirable for the proper treatment of many questions which arose in the rapidly developing art of telephony. It therefore became increasingly clear that some more continuous and more flexible form of co-operation between the European telephone administrations was necessary.

After the close of the Great War when repeaters, long distance toll cables, carrier telephone systems and other modern

developments began to be applied on a large scale to international telephony in Europe and when international trade began to resume its normal importance, there was considerable discussion of this need and various specific proposals were made. A decisive step toward crystallizing the current views into action was taken early in 1923 by a conference held in Paris between representatives of the telephone administrations of Belgium, Spain, France, Great Britain, Italy and Switzerland. This conference, organized as a preliminary committee, recommended that a permanent advisory organization be constituted. This recommendation was generally adopted by the telephone administrations of Europe and in this manner was created the present International Advisory Committee.

Method of Work of the C. C. I.

The International Advisory Committee on Long Distance Telephone Communications (known as the C. C. I. from the initials of its name in French) has, with its constituent subcommissions, since its formation, held frequent meetings and has developed a very effective form of organization and method of work.

The governing body of the Committee is the Plenary Assembly consisting of delegations from the member telephone administrations. The function of this body is to approve, reject or modify proposed recommendations which have been prepared by the working commissions and which when approved by the Plenary Assembly constitute recommendations of the C. C. I. to the member administrations. The Plenary Assembly also determines what questions shall be studied by the working commissions and passes upon all questions of organization and financing of the C. C. I. and its component parts. At the present time the Plenary Assembly meets about once a year.

The study of technical questions and the preparation of recommendations are carried out by a group of working com-

missions (Commissions de Rapporteurs). These commissions meet as often as need be to carry on their work, generally about twice a year. At the present time there are seven of these working commissions dealing with a wide range of plant, traffic, commercial and operation questions.

The general scope of work of each of the commissions is indicated by the following list:

CR 1. Questions concerning the protection of telephone lines against the disturbing action of power systems.
CR 2. Questions concerning the protection of telephone cables against corrosion due to electrolysis or to chemical action.
CR 3. Questions concerning transmission and maintenance.
CR 4. Questions concerning the master reference system for telephone transmission, primary reference systems and working standards.
CR 5. Questions concerning the co-ordination of wire telephony and radio telephony.
CR 6. Questions concerning traffic and operating.
CR 7. Questions concerning rates.

Another main branch of the Committee is the General Secretariat. This consists of a permanent staff located at Paris which supplements the meetings of the Plenary Assembly and the working commissions by a very extensive correspondence and makes arrangements for the various meetings. Major Georges Valensi who was formerly associated with the French telephone administration has since the organization of the C. C. I. held the position of General Secretary.

During its relatively brief existence the C. C. I. has engaged in a considerable amount of co-operative work with other organizations whose work bears upon international telephone problems. An important item of this co-operative work has been co-operation on inductive co-ordination matters with the International Railway Union, the International Union of Pro-

ducers and Distributors of Electricity, the International Conference on High Voltage Electric Systems, and other organizations concerned with this problem. Since the organization of the C. C. I. similar advisory committees have been formed for telegraphy and for radio matters, and the C. C. I. has naturally co-operative relations with them on problems of mutual concern. It has also established co-operation with the International Broadcasting Union and with other international bodies.

While organized at first independently of any existing international agency, the C. C. I. became formally affiliated in 1926 with the International Telegraph Union. Under this arrangement the C. C. I. maintains an autonomous status and communicates its recommendations to the Bureau of the International Telegraph Union.

Participation of the Bell System

From the beginning of its organization the International Advisory Committee has had the hearty co-operation of the Bell System. The questions to be studied by the working commissions were transmitted to the American Telephone and Telegraph Company from time to time with the request that it send to them information regarding practices in this country which might be helpful in the consideration of these questions by the European administrations. Naturally the Company was glad to be of any service it could in response to these requests.

In 1925 the Committee took up a consideration of international agreement on units of telephone transmission and requested that representatives be sent over to explain the American practice to the European delegates. Representatives went to C. C. I. meetings in 1925 and 1926 to discuss this and associated questions. Following these discussions the C. C. I. adopted a master transmission reference system identical with the Bell System standard and recognized as standard two units

of transmission loss, one the "decibel" used in this and some other countries and the other the "neper" used in some of the European countries.

With the extension of the work of the C. C. I. it became evident that many questions should be considered which, like transmission units and reference systems, have a world-wide application and are not limited to co-operation between the countries of Europe. This was accentuated by the development of intercontinental telephony by means of long radio and other circuits, inaugurated in 1927 by the establishment of commercial service between New York and London. It was evident that to an increasing extent international telephony was becoming not only a European problem, but a world problem as well, and it was decided by the C. C. I. to broaden the scope of their work and invite the telephone administrations in countries in all parts of the world who desired to co-operate in the work to join the organization. In accordance with this policy the C. C. I. sent in 1929 an invitation to the American Telephone and Telegraph Company to join the C. C. I. as representative of the Bell Telephone System. This invitation was accepted and the Bell System became formally associated with this work on June 11, 1929.

The first Plenary meeting since the adherence of the Bell System to the C. C. I. took place in Brussels June 16 to 23 of this year. It was attended by a delegation of representatives of the American Telephone and Telegraph Company headed by Vice President Gherardi and including Mr. H. E. Shreeve, Technical Representative of the Bell System in Europe; Mr. J. F. Bratney, Mr. W. H. Harrison, Mr. A. B. Clark and Mr. W. Fondiller. There were present delegations representing telephone administrations from 23 other countries, members of the Committee, and in addition a representative from Japan and representatives of various electrotechnical groups. Following the usual custom, after a general opening meeting the Committee divided into sections which studied in detail the

recommendations of the various working commissions submitted for approval. After modification and informal approval of these recommendations by the sections of the Plenary Assembly a closing meeting of the Assembly as a whole was held at which formal approval was given to the recommendations of the various working commissions and of their proposed programs of work for the coming year. The entire series of meetings occupied eight days. Associated with them were some very enjoyable excursions and entertainments, including an official dinner given to the delegates by the Belgian Minister of Posts, Telegraphs and Telephones.

Naturally a good deal of the work of the C. C. I. is done throughout the year at meetings of working commissions and through informal contacts between the representatives of the various administrations. Regular participation in these various activities on behalf of the Bell System is maintained by Mr. Shreeve and his assistants from the London office of the American Telephone and Telegraph Company.

While from the nature of the situation much of the work of the C. C. I. deals with problems which primarily concern the better handling of international telephone traffic between European nations, important questions are being considered by the Committee which should in the long run help in obtaining general world-wide agreement on many matters concerning intercontinental telephone service, and in this way help in attaining the greatest development of this service. Also there is advantage in reaching world-wide agreements on many questions of standards and methods as illustrated in the question of transmission units. The advantages of Bell System co-operation in this work, however, do not end with these formal questions. The opportunity for better acquaintance between the representatives of the telephone industry in different countries is an important feature of the work of the C. C. I. and one which the American Telephone and Telegraph representatives greatly appreciate. Incidentally the work, of course, offers many opportunities for very pleasant personal contacts.

Accomplishments of the C. C. I.

As previously indicated, the work of the C. C. I. is wholly advisory, the committee having no authority to compel the adoption of its recommendations by the telephone administrations. This is probably the only way under which the Committee's work could be carried out at the present time, and it has some important advantages in assuring that its recommendations really represent a substantially unanimous consensus of the views of the different delegations and, therefore, are likely to meet the general approval of the administrations.

The recommendations of the Committee at the present time constitute several hundred printed pages. These are naturally designed particularly to apply to European practice. While any comprehensive review of this material would be out of place here, a brief statement of some outstanding points is of interest.

An important group of recommendations relates to general operating questions. These provide for new forms of service including a more complete person-to-person service, and short period talking service on a special contract basis, and also give details of methods of handling these services. General service regulations are liberalized to permit longer talking periods and to insure greater effort on the part of operators to complete toll calls. Provision is made for the establishment of alternate and emergency routes and for the extension of international service to new areas. Important recommendations deal with the more adequate provision of circuits to reduce delays and for the better forecasting of future circuit needs. This matter is still being actively studied.

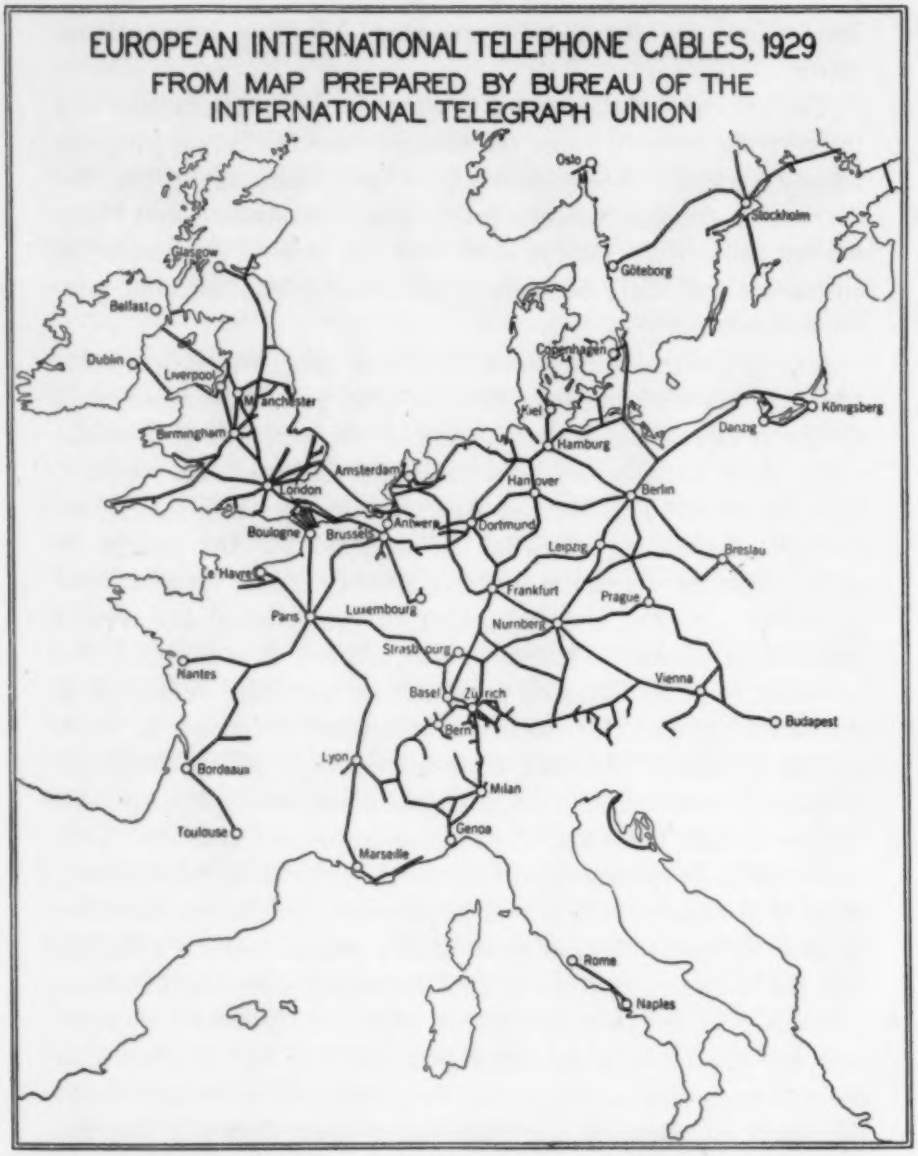
New traffic operating practices have been provided suitable for handling the new services and the practices for present services are improved by a number of recommendations. Arrangements have been made for the collection of traffic statistics. Work is now proceeding on a manual of operating

instructions for the use of operators handling international traffic.

The recommendations tend to simplify the rate structure and provide the basis of rates for new services, including program supply service. Recommendations are made regarding the division of charges between originating, terminating and intervening countries. Others deal with the sale of directories to customers and with methods of stimulating international telephone business.

A large bulk of the recommendations deals with plant matters. Much work has been done in specifying the transmission design of international circuits and of connecting lines to make them meet satisfactory standards for international service. This has resulted on the one hand in a group of outline specifications containing essential information for the design of cables, loading, repeaters and even for complete international telephone circuits, and indicating in some detail the design features to be used. Recent work in this line of the C. C. I., however, has been directed more toward a careful definition of the fundamental electrical characteristics required of each section of circuit including transmission equivalents, width of frequency band transmitted, and limits of echoes, phase distortion, crosstalk, noise and of range of transmission level. This seems to be an advantageous method of approach, particularly in view of existing differences in practice in different countries in such things as the design of cables and of loading systems, and the rivalry between different manufacturing organizations in Europe in the development of improved systems. Accompanying the recommendations just outlined are fundamental definitions of the units, terms and methods of measurement necessary for defining the electrical characteristics of the circuits.

An important part of the C. C. I.'s plant recommendations relates to the maintenance of the circuits, giving maintenance routines, methods of test and specifying even the tests on local



circuits and subscribers stations. The information for the maintenance of long international circuits is now being actively expanded.

Other recommendations relate to the linking of radio and

wire circuits, to the use of telephone and telegraph in the same cables, and to the requirements for special services including program circuits and picture transmission circuits.

One volume of C. C. I. recommendations contains provisions for co-ordinating international telephone circuits with power and electrified railroad circuits so as to avoid interference. These provisions have resulted from the co-operative work of the telephone representatives with representatives of international organizations of power companies and railroads. Another volume contains proposals regarding means to avoid electrolytic and chemical corrosion of cable sheaths.

Conclusion

Although the life of the International Advisory Committee has not been long, it has coincided with a period of intense international telephone development in Europe. It is estimated that by 1928 the European international telephone business had increased by more than 70 percent over that of 1925. Very rapidly the important international telephone routes in Europe have been placed in toll cable. This is indicated in the accompanying chart which shows the important telephone cables in Europe in 1929. More than half of this toll cable network has been built up since 1925.

To a large extent the successful handling of both the technical and business problems brought about by these rapid developments of international telephone business in Europe can be credited to the closer co-operation of telephone administrations resulting from the work of the C. C. I. Its activities can be expected to continue to be of increasing benefit in the development of the European telephone network. With the extension of the activities of the C. C. I. to include world-wide questions, there is every indication that with the further development of intercontinental telephony its activities will continue to broaden and grow in importance.

H. E. Shreeve
H. S. Osborne

1930 Stock Offer of the American Telephone and Telegraph Company

IN a circular letter dated April 16, 1930, the American Telephone and Telegraph Company announced an offer to stockholders of record at the close of business on May 23, 1930, of additional shares of stock at par, $100, in the proportion of one new share for each six shares then held. Rights to subscribe expired on August 1, 1930. The terms of the offer were similar to those of the offer in 1928. The issue, as usual, was not underwritten.

Debenture Bonds of 1939 Largely Converted

The terms of the offer provided a period of approximately five weeks, longer than usual, between the announcement date and the record date for subscription rights. This longer period was provided so that holders of the Ten-Year Convertible 4½% Gold Debenture Bonds (offered for subscription to the stockholders in 1929) who might desire to convert their bonds into stock in time to receive subscription rights, might have ample opportunity to act. Between the announcement date and the record date more than $132,000,000 principal amount of the convertible bonds, or sixty percent of the issue, were converted into an equal amount of stock which was entitled to subscription rights.

Purpose of the Issue

The purpose of the issue, as stated by President Gifford, was to provide funds for new construction needed by the Bell System to care for additional business resulting from the constantly greater use of telephone service.

The amount of stock offered was $257,940,700 at par, being about 39 percent more than in the 1928 issue. Stockholders receiving rights numbered 508,764. The average amount offered was approximately $500 per stockholder.

ISSUE WELL SUBSCRIBED

The success of the offer is shown by the fact that less than one-fifth of one percent of the shares offered were not subscribed—a smaller ratio than for any similar stock issue of the Company. The local facilities provided through Bell Telephone business offices to help stockholders and the efforts made throughout the country to reach those who were thought most likely to need assistance, were doubtless responsible for reducing to a minimum the number of stockholders who, through lack of knowledge or carelessness, sacrificed their rights by allowing them to expire.

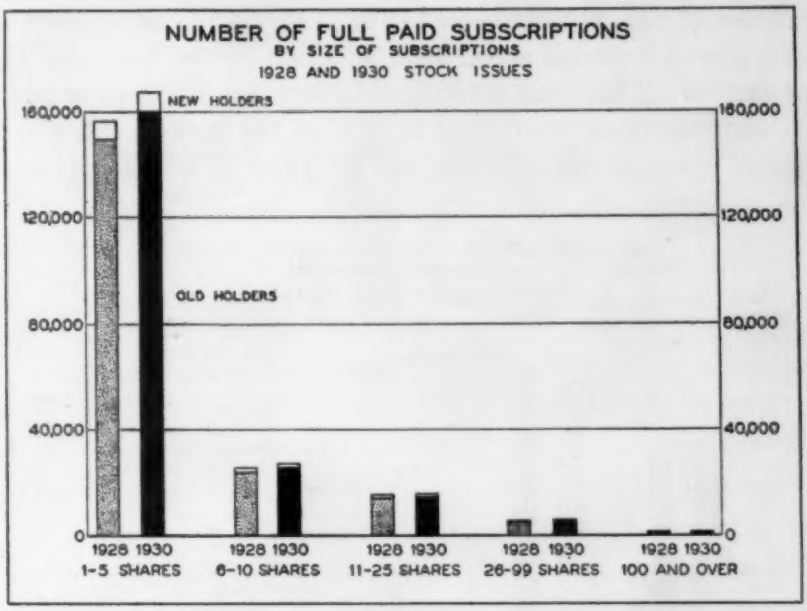


CHART I

During the period of the offer general business activity was at a low level. The securities market was in a state of unusual quietude with the general trend somewhat downward. Rights sold on the market at prices ranging principally between $21 and $17, an average higher than that of any previous issue of

the Company. The subscriptions received numbered over 283,000, some 18,000 more than in the 1928 issue. There was an increase in the average number of shares per subscription from 7.0 in 1928 to 9.1 in 1930.

Subscription Statistics

At the present time the usual analysis of subscriptions has been completed only for those paid in full. Chart I on the preceding page shows these subscriptions classified as to size for the 1930 and 1928 stock issues. The lower shaded portion of the columns represents those entered by stockholders of the record date while the upper unshaded portion represents the number of new holders gained in each group. The important rôle played by small subscribers is shown by the fact that 77 percent of all full-paid subscriptions were for 5 shares or less. In addition more than three-fourths of the new stockholders gained through subscriptions fell in the 1 to 5 share group.

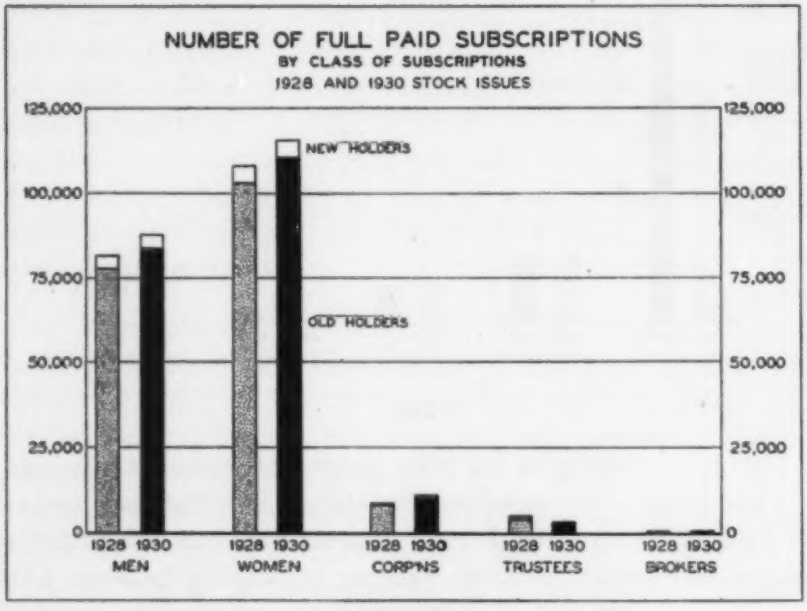


Chart II

Of a total increase of 12,000 in full-paid subscriptions over the 1928 offer, those in this group accounted for 9,500.

Chart II shows full-paid subscriptions for the 1930 and the 1928 stock issues classified according to men, women, corporations, trustees and brokers. In both offers there were more women who subscribed than men; women also formed a larger proportion of the new holders added; and men and women together accounted for 93 percent of the full-paid subscriptions.

As in previous issues the average size of full-paid subscriptions was somewhat greater than that of installment subscriptions. The following table gives comparative data for the 1930 and 1928 stock offers.

TABLE I

COMPARATIVE STATISTICS OF THE 1930 AND 1928 STOCK ISSUES
(1930 Figures Partly Estimated)

	1930 Stock Issue	1928 Stock Issue	Increase 1930 over 1928
Par value of stock offered	$257,940,700	$185,863,000	38.8%
Stockholders on record date	508,764	432,004	17.8%
Market value of a share on closing date for subscriptions	$209⅝	$176	$33⅝
Full-paid subscriptions	218,289	206,075	5.9%
Percent of total subscriptions	77.1%	77.8%	−.7%
Installment subscriptions	64,914	58,772	10.5%
Percent of total subscriptions	22.9%	22.2%	.7%
Total subscriptions	283,203	264,847	6.9%
Shares subscribed—full-paid	2,083,781	1,552,598	34.2%
Percent of total subscribed	80.9%	83.8%	−2.9%
Shares subscribed—installment	491,771	299,437	64.2%
Total shares subscribed	2,575,552	1,852,035	39.1%
Subscriptions by stockholders	270,703	250,032	8.3%
Percent of stock subscribed	96.5%	95.0%	1.5%
Subscriptions by others	12,500	14,815	−15.6%
Average shares offered per holder	5.1	4.3	.8
Average shares per subscription:			
Full-paid	9.6	7.5	2.0
Installment	7.6	5.1	2.5
Total	9.1	7.0	2.1

Local Contacts With Subscribers

Stockholders throughout the country were aided as before in the purchase and sale of rights by the Bell Telephone Securities Company which offered its facilities at about 3,000 of the business offices of the Associated Companies. That this service proved of convenience to small stockholders is shown by the fact that the average transaction was for 4.1 rights. Approximately 99,000 purchases and sales of rights were thus arranged, or one-third more than the number so handled in 1928; and, as in the case of previous offers, the larger proportion of these transactions were with the stockholders residing west of the Mississippi River, in which territory a large percentage of holders have acquired stock through the Bell Telephone Securities Company.

A study of these rights purchase and sale transactions shows that the average size of the transactions varied only slightly between large and small communities. It was found that women availed themselves of the local facilities to a greater extent than did men.

TABLE II

Rights Transactions Through Associated Companies by Size of Community

Population of Community	Number of Rights Transactions	Number of Rights Involved	Average Rights Per Transaction
Less than 5,000	3,690	15,499	4.2
5,000–99,999	27,783	118,687	4.3
100,000–999,999	34,703	142,814	4.1
1,000,000 and over	33,032	134,303	4.1
Total	99,208	411,303	4.1

There were also handled some 55,000 transactions in the purchase and sale of rights at the New York and Boston offices of the American Company, applications being made either in person or by mail. Chart III on page 256 shows the number of rights transactions, both purchase and sale, recorded by the

Bell Telephone Securities Company. In addition to arranging rights purchase and sale transactions, the Associated Companies again received subscriptions at their business offices for forwarding to the American Company and more than 52,000 subscriptions were thus handled.

The following table gives certain data concerning the number of rights purchase and sale transactions and subscriptions arranged by the Associated Companies for their patrons.

TABLE III

1930 STOCK ISSUE TRANSACTIONS HANDLED LOCALLY BY ASSOCIATED COMPANIES FOR THEIR PATRONS

Associated Companies	Purchases and Sales of Rights		Subscriptions Filed	
	Number of Transactions	In Percent of Stockholders Resident in the Territory	Number of Transactions	In Percent of Stockholders Resident in the Territory
New England Tel. & Tel. Co.	1,857	1.7%	1,718	1.5%
Southern New England Tel. Co.	771	5.1	389	2.6
New York Tel. Co.	12,616	12.9	6,743	6.9
New Jersey Bell Tel. Co.	3,352	11.4	1,660	5.6
Bell Tel. Co. of Penn.	10,745	23.4	5,164	11.2
Chesapeake and Potomac Tel. Co.	4,614	23.0	2,397	11.9
Southern Bell Tel. & Tel. Co.	3,703	20.5	1,656	9.1
Michigan Bell Tel. Co.	3,505	41.8	1,198	14.3
Indiana Bell Tel. Co.	1,084	37.3	255	8.8
Wisconsin Tel. Co.	4,108	46.0	1,693	18.9
Illinois Bell Tel. Co.	16,310	33.3	7,662	15.6
Northwestern Bell Tel. Co.	5,691	44.5	2,528	19.7
Southwestern Bell Tel. Co.	10,650	47.4	5,236	23.3
Mountain States Tel. & Tel. Co.	3,639	36.1	2,163	21.5
Pacific Tel. & Tel. Co.	16,563	41.1	12,395	30.8
Total	99,208	20.1%	52,857	10.7%

AID RENDERED UNINFORMED STOCKHOLDERS

As in other recent subscription offers, all practicable steps were taken to reduce the number of stockholders who might allow their rights to expire. A questions and answers circular explaining as simply as possible all pertinent facts concerning the issue was mailed with the subscription warrants to all stockholders as heretofore. Then the names and addresses of stockholders who failed to utilize their 1929 subscription rights to

the Convertible Bonds were prepared on cards. These were singled out as the ones most likely to need personal assistance this year. To each of these a brief letter of information was mailed from New York. The cards were then assorted geographically and sent to Associated Companies.

Representatives of the Associated Companies reached more than 82 percent of the 10,500 persons listed. Telephone conversations were had with 6,000 of them, personal interviews with 2,300 and letters sent to 1,000. Complete service was prevented by the fact that several hundred had changed their addresses without notifying the American Company.

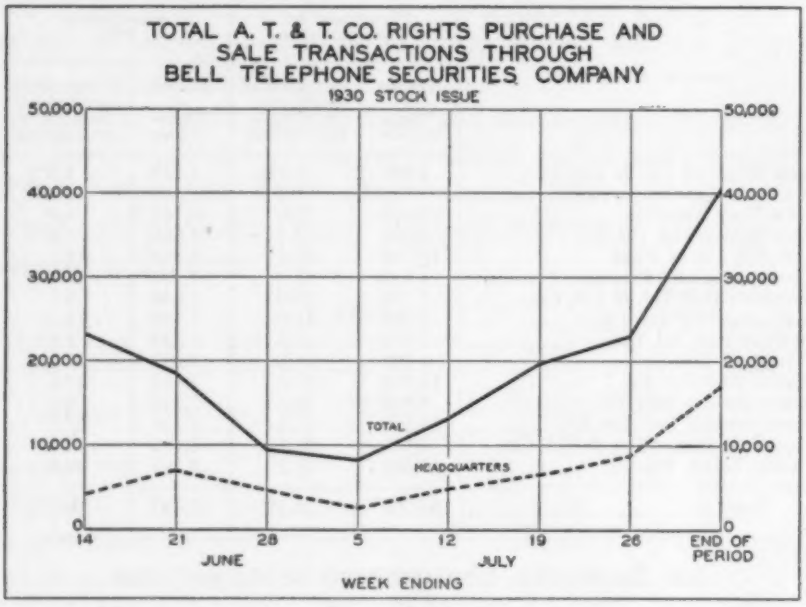


CHART III

Of the individuals reached in the field, more than one-fourth are reported as having needed help. It was discovered that some claimed not to have received their warrants, others to have lost or destroyed them. In such cases the field representatives arranged for the replacing of the missing warrants.

These contacts with the resulting human interest stories were a source of satisfaction to those associated with the work. One stockholder, a widow, who had been in ill health and was only able to be around in a wheel chair, stated when called upon that she had no money and thought her rights valueless unless used by her for subscription. Needless to say she was happy to receive some $800 from their sale.

Another widow working in a department store and supporting her mother and a young son, showed considerable amazement upon being informed that her warrants had a real cash value, as it was her belief that they were sent her in an advertising scheme.

The family of a deceased stockholder was holding the subscription warrants and two dividend checks, not knowing what to do with them. With the aid of the representative, arrangements were made for the sale of the rights, transfer of the stock and collection of the dividend checks.

A stockholder residing in a small town forwarded his warrant to the Treasurer of an Associated Company giving as his reason that he was not able to subscribe and could not sell his rights where he lived. He expressed surprise upon receiving

TABLE IV

FOLLOW-UP BY ASSOCIATED COMPANIES OF STOCKHOLDERS WHO HAD FAILED TO UTILIZE THEIR 1929 SUBSCRIPTION RIGHTS

1930 Stock Issue

Territorial Classification	Stockholders Reached		Stockholders Not Reached	Total Stockholders on List	Percent of Total Stockholders in Territory
	Needing Assistance	Not Needing Assistance			
New England Group	262	932	326	1,520	1.2%
Eastern "	711	2,201	759	3,671	1.9
Central "	524	1,424	297	2,245	2.8
Southern "	164	365	108	637	3.5
Northwestern "	101	235	65	401	3.1
Southwestern "	295	439	118	852	3.8
Mountain "	83	216	29	328	3.3
Pacific "	121	618	99	838	2.1
Total	2,261	6,430	1,801	10,492	2.1%

a check a few days later covering the sale price of his rights.

Numbers of the stockholders interviewed showed appreciation of the interest taken in rendering them help. In many instances the amount realized was of importance to them. Table IV on the preceding page gives territorial data concerning this work.

Organization Handling Stock Issue

With each successive stock issue, methods of procedure and general plans of organization have been modified and improved; and stockholders have become better acquainted with the facilities offered for service. It is believed that the 1930 offer, the largest ever made by the American Company, was handled with more dispatch than any of its predecessors.

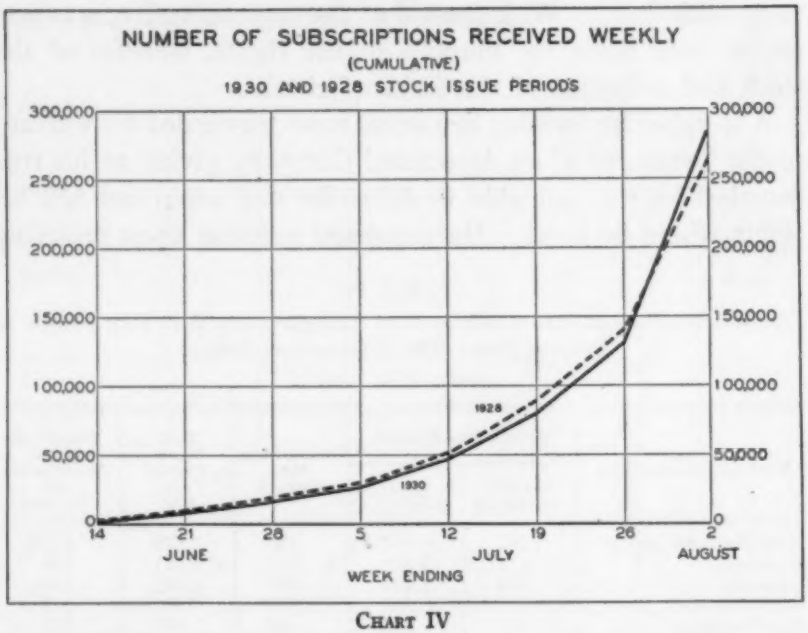


Chart IV

Some figures will give the reader an idea of the size of the latest undertaking from the standpoint of the Treasury Department. From 3,500 candidates interviewed for positions, approximately 800 temporary employees were engaged and

I. Reception Room for Persons Seeking Stock Issue Employment.

II. Part of the Organization Handling Conversions of the Debenture Bonds of 1939 Prior to the Record Date for Rights.

III. The First Step in Reviewing Subscriptions for Acceptance.

IV. Typists Recording Subscriptions on Fan-fold Forms with Others Preparing Stock Certificates.

V. Part of the Organization Preparing Stock Certificates for Mailing.

VI. A View of Part of the Bureau Handling Stock Issue Correspondence.

trained for stock issue work, and 56 van loads of furniture, equipment and supplies were provided for their use. More than 750,000 full and fractional share warrants of original issue were prepared and sent to the 500,000 stockholders; more than 600,000 pieces of subscription mail were received and dispatched in little more than three months, many of these involving incomplete subscriptions.

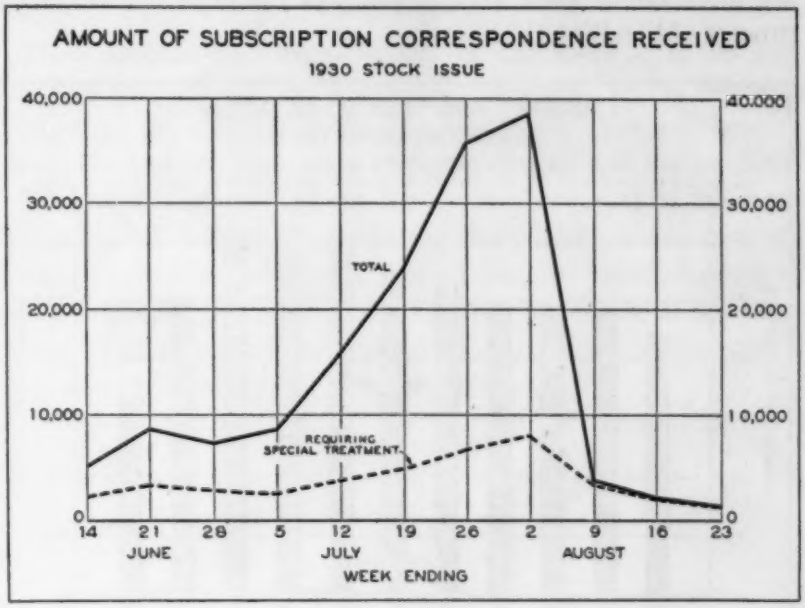


CHART V

The total number of subscriptions received weekly on a cumulative basis for both the 1930 and the 1928 stock offers is presented on Chart IV. In the last week of the subscription period more subscriptions were received than had been filed during the six weeks following the mailing of the warrants. In fact, there were 99,000 subscriptions in process of acceptance on the closing date, August 1. Chart V shows the substantial proportion of the subscription correspondence received in the later weeks of the offer. Of the mail received, 27 percent of

the cases required special attention and the sending of 31,000 individually dictated letters.

One of the features of the organization was the control exercised at all times over the flow of work, regardless of volume. Supervisors knew the status of their work hourly, both in the numerous phases of accepting and registering subscriptions and in receiving and dispatching correspondence. The accompanying illustrations show various parts of the organization in the process of handling their work.

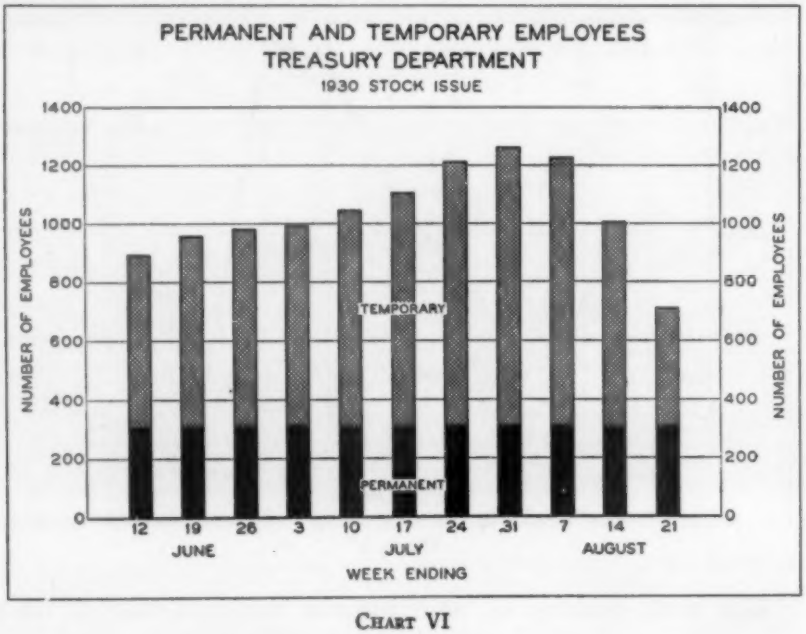


CHART VI

Special attention was directed toward securing adequate personnel. More than 350 of the men engaged were students or graduates of colleges and universities; also the Company had the good fortune to secure a number of professors and instructors, free for summer employment. To train these new employees, various courses were conducted along both general and specialized lines. In all, a total of more than 300 hours of

class instruction was given which, undoubtedly, increased the productivity of the entire organization. Chart VI gives one an idea as to how the personnel of the Treasury Department was expanded and contracted to meet the requirements of the stock issue work. At the peak of the rush three-fourths of the organization were temporary employees.

CONCLUSION

More stockholders participated in the issue than in any previous offering by the American Telephone and Telegraph Company; the amount of the offer was larger than any heretofore made and the percentage of rights unused was the smallest.

The employees throughout the country engaged in the work showed great interest in rendering their best service and the work was done expeditiously and efficiently. Stockholders in many sections generously commended the services rendered them. The wholehearted co-operation of all made the issue a most successful one in all of its aspects.

H. BLAIR-SMITH

Bell System Sales Activities

SALES activities have always played an important part in Bell System operations. The exception to this embraces the period during the war and immediately thereafter when the Bell Operating Companies were suffering from the diversion of men, materials and supplies for war purposes.

In the early days sales work was directed to convincing the public that the "scientific toy," as the telephone was called shortly after its invention, was a useful and reliable means of communication. At that time the telegraph was well established and well accepted by the public; for less urgent requirements the mails and the use of messengers seemed adequate. Much emphasis was placed on the written word and considerable pride was still taken in the art of penmanship. This was the situation that faced the pioneers in the telephone industry. It seemed that they alone had the vision of the ultimate place of telephone service in business and social affairs. For instance, the articles of incorporation of the American Telephone and Telegraph Company in 1885 anticipated service between the principal cities of the United States, including those on the Pacific Coast, "and with the rest of the known world, as may hereafter become necessary or desirable. . . ." The attainment of this objective included in the articles of incorporation is now near at hand. It has required continuously a combination of research and sales effort.

But it may be asked, "Why should the Bell System be active in sales at present and in the years to come, since competing telephone companies in any one community are practically a thing of the past?"

First let us consider the matter of competition. While competing telephone companies in any one community are practically non-existent, this does not mean that the telephone is in

a non-competitive field. As a matter of fact, telephone service competes with all other forms of communication and is competitive in many respects with transportation. Due to this competition, it is necessary continuously to improve the service and to develop more convenient instrumentalities, and to apprise the public of these developments and how they can be made a source of additional convenience and profit. Furthermore, it is necessary to insure that each customer has the proper class of service and that the arrangements and quantity of instrumentalities on his premises are wholly adequate and suited to his particular requirements.

Until recent years telephone service generally has been viewed only in the light of a necessity. In the modern era of greater convenience and comfort both in business and in the home, the provision of telephone service is being viewed from a broader standpoint than that of necessity alone. This has led to a demand for more telephones per customer for both business and residence purposes. When this new view of furnishing telephone service is taken into consideration, it is evident that the telephone company is competing with other industries for the customer's dollar available for purchasing services or products which contribute to his convenience and comfort. While the telephone company, from the nature of its service, must be a monopoly in its field, the field itself is competitive with a number of others.

The Bell System could not have attained its present position without being progressive. The extent to which a business institution meets the public's requirements is generally held to be the degree to which it desires to serve. A desire to serve is usually manifested by the effort to sell service of high quality and this is the particular thing which the public recognizes because it is accustomed to using this measure. The sales viewpoint at all times embodies the interested and friendly attitude toward customers' desires. No company can be indifferent to public requirements if it desires the good will and confidence of the public.

An explanation of the need for sales activities by the Bell System is found in the address by President Walter S. Gifford before the Convention of the National Association of Railway and Utilities Commissioners at Dallas, Texas, and in his 1927 annual report to the stockholders of the American Telephone and Telegraph Company. At Dallas, Mr. Gifford said in part:

"the fact that the responsibility for such a large part of the entire telephone service of the country rests solely upon this company (The American Telephone and Telegraph Company) and its Associated Companies, also imposes on the management an unusual obligation to the public to see to it that the service shall at all times be adequate, dependable and satisfactory to the user."

In the 1927 annual report, Mr. Gifford reiterated this statement in the following words:

"The American Telephone and Telegraph Company accepts its responsibility for a nation-wide telephone service as a public trust. Its duty is to provide the American public with adequate, dependable and satisfactory telephone service at a reasonable cost."

Certainly if people who can afford telephone service are without it, or subscribers who have telephone service are utilizing facilities or equipment of a type which does not meet their service requirements, or which does not enable others to reach them satisfactorily, the service cannot be considered wholly adequate. Since the public does not know in many cases what constitutes adequate service, and does not know what services and facilities are available, or what the price may be, it is clearly the responsibility of the company to make these facts known to its customers.

While the telephone company is thoroughly equipped and organized to provide "dependable" service, there is no assurance that it will be furnished unless subscribers are persuaded to buy the amount and type of service which they can conveniently and profitably use. This is true because inadequate or unsuitable facility arrangements frequently interfere with de-

pendable service, not only of the individual concerned, but also of other people who call him. To illustrate this, it is only necessary to mention conditions where subscribers have insufficient lines to handle their outgoing and incoming calls or have party lines where they need individual lines. Some business concerns are attempting to handle their traffic over terminal facilities not suited to their communication needs. There are also cases where subscribers do not answer or are slow in answering because of a lack of extension telephones. Often an effort is made to have one telephone serve the home where two or three would add materially to the convenience and dependability of the service.

Analyses of subscribers' complaints reveal that the causes of service difficulties are frequently related to the type of service, the location of the equipment, insufficient lines or stations, or other conditions of this character. Sales efforts to correct such difficulties usually remove the source of trouble and result in improved customer relations. In some exchanges a relatively high percentage of the residence telephones is served by four-party lines. Too great a percentage of four-party telephones has a detrimental effect on furnishing dependable service because of busy conditions and other types of party line interference. Here again, sales work is effective in improving the general service as well as the service of the individual.

The Bell System has its laboratories and research organizations which are continually devoting their attention to the advancement of the industry and the development of the more efficient methods of operation. These contribute materially to the improvement in quality of service and the means of producing it. Among the various things that these research organizations are doing is the development of equipment more pleasing in appearance, more convenient and more easily used. These improvements in service and instrumentalities are being brought effectively to the attention of customers through sales activities.

The products of the Bell System are services in various forms and practically all employees are engaged in rendering those services. Service embodies not only the rendering of good transmission and the speedy completion of calls, but also includes the provision of adequate and properly arranged facilities on the subscriber's premises. When telephone employees have been offered the opportunity to contribute to the general improvement of the business, they have manifested a marked willingness to assume the responsibilities for carrying on the work successfully. All employees, therefore, whether they be engaged primarily in the plant, traffic, commercial or other departments, are encouraged to engage in sales work in the interest of improving the overall service. This common objective leads to a company viewpoint rather than departmentalism and an improved morale results.

While all employees are encouraged to sell service in connection with their company duties and as they have opportunities outside of office hours, the chief responsibility for sales work rests with the commercial organization. The business office employees of the company have a direct responsibility to sell service in the interest of insuring adequate, dependable and convenient service in every case. These employees must be competent fully to analyze the subscriber's requirements and to recommend those services and facility arrangements most appropriate for the subscriber's needs. This sales viewpoint obtains not alone for new subscribers, but also in the case of present subscribers in connection with business office visits, telephone calls, or in correspondence.

In addition to the business office organizations, most commercial departments also have a number of well trained representatives who devote their entire time to sales work. These employees are actively calling on subscribers in order to obtain a better perspective of the subscriber's business or domestic requirements so that the provision of proper service and equip-

ment arrangements may be insured. In the case of the larger business private branch exchange installations, it is frequently necessary for these employees to spend considerable time on the subscriber's premises in the analysis of the subscriber's requirements before recommendations can be made. In these cases as in all others, adequate attention is given to the requirements for both local and toll service. Experience has shown that facility arrangements as well as uses of the service can usually be recommended which result in increased convenience and greater value of the service.

Among the more usual exchange services available for business subscribers' use may be mentioned main stations, extension stations, wiring plans, private branch exchange service, order receiving equipment, code calling equipment, conference calling equipment, foreign exchange service, telephone typewriter service, off-premise private branch exchange stations, toll terminals, tie lines, private lines, etc. The more usual toll services include message toll service, short period and full talk service, reversed toll service, telephone typewriter service, Morse service, etc. Attractive service features such as the key town calling plan, the credit plan and sequence calling are also available for toll using customers. In the case of business subscribers co-operation is extended to architects and builders, preliminary to building or remodeling structures, in providing for proper conduit and other arrangements which will expedite the establishment and maintenance of service in an orderly manner.

In the residence market, especial attention has been given the last two or three years to providing proper service arrangements in the larger homes. A new dial intercommunicating system known as the 750-A private branch exchange has been developed which permits comprehensive intercommunication within the home and adequately provides for central office service. This System has many attractive service features which are discussed in another article in this issue of the Quarterly. Among the various features, separate lines may

be provided for servants' use as in the case of other types of service which are offered. While this equipment only became available early in 1930, a large number of installations have already been made.

In the larger homes which do not require private branch exchange service wiring plans are being furnished which provide for holding and pick-up arrangements, for the transfer of calls and for a certain amount of intercommunication between various rooms. This arrangement is proving very popular and there is an increasing appreciation of the comfort and convenience afforded by several telephones conveniently located. Until recently the same considerations had not been given to telephone convenience and comfort as to other home conveniences. Through active sales work an attempt is being made to correct this situation, especially in view of the fact that telephones may be located in the living room, bedrooms, guest rooms, kitchen, basement, garage and servants' quarters at a surprisingly low cost. Jack and plug equipment with portable telephones in various locations adds materially to telephone comfort and convenience.

In smaller homes, as well, particular attention is given to the provision of the proper class of service, involving the installation of one or two additional telephones in convenient locations, such as the master bedroom and the kitchen.

It has also been found that a large percentage of residence subscribers are not fully conversant with the speed, quality and low cost of toll service. An effort is being made to give residence subscribers full information regarding toll service, together with telephone numbers and rates to friends, relatives or others located in out-of-town points. In building new homes or in remodeling present buildings it is desirable to arrange for conduit for telephone wiring in order to expedite the installation and maintenance of service. Bell operating companies extend full co-operation to home owners, architects and builders in providing for this desirable arrangement.

Other phases of sales work include the sale of service to non-subscribers, the sale of auxiliary and by-product services of many classifications to existing customers and the sale of directory listings, display advertising and trade mark headings in the classified directories for the convenience of the shopping public.

While the telephone industry has much in common with other businesses, there is one respect at least in which it is quite different and that is, the service of one individual cannot be isolated from that of his business associates, friends, acquaintances or any other telephone customers with whom he may have occasion to communicate. Inadequate service for one customer reacts unfavorably upon the service of others. Since the overall service is a composite of individual services, sales activities are instrumental in protecting and improving the quality of general service rendered.

The Bell System has given especial attention to sales work during the last two or three years. Customers are appreciative of this increased interest to improve their service and to make it more convenient and valuable to them both for business and social purposes. The philosophy of this sales work is that the Bell System desires to fulfill its duty to provide adequate, dependable and satisfactory service at a reasonable cost.

H. C. LAUDERBACK

An Intercommunicating System for Homes and Offices

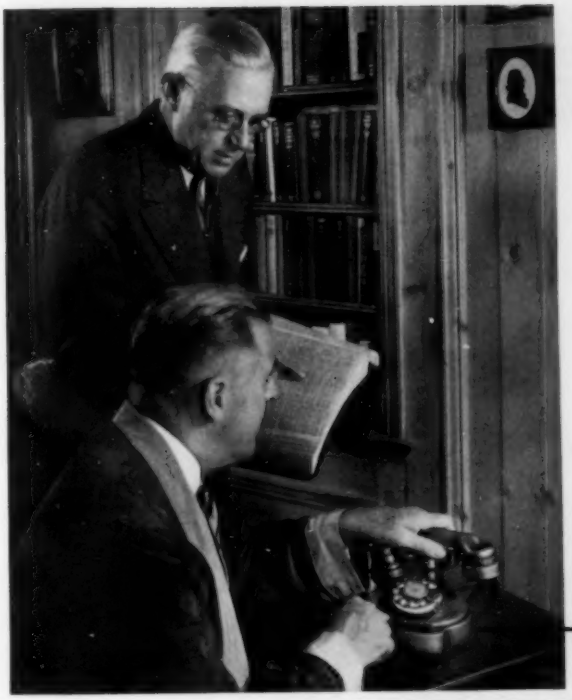
THE Bell System is continually working to make available new facilities and equipment to provide complete and convenient telephone service, which is well adapted to the needs of its customers. One of the newest of these arrangements, is an intercommunicating system that has been very favorably received as shown by the large number already in service and the many additional installations under consideration. It is suitable for the larger residences and apartments, for small estates and for business offices of moderate size, and is known to telephone people as the "750-A Private Branch Exchange."

This new system offers a number of desirable features. It is simple to operate and from each telephone both outside calls and intercommunicating calls within the residence or office may be made. The instruments are of attractive design and may be obtained in various colors, if so desired.

No operator or attendant is required to answer incoming calls, since this can be done by means of push buttons at any of the telephones. Likewise, outgoing calls are established without the aid of an attendant. Intercommunicating calls are made by means of the dial. Incoming calls answered at any telephone may be transferred to any other telephone of the system.

The equipment is arranged so that both intercommunicating and outside conversations may be carried on from different telephones at the same time. Complete secrecy for both outside and intercommunicating connections is provided.

To meet varying service requirements this exchange is available in two sizes; the larger with a capacity of fifteen telephones and three outside lines and the smaller with eight telephones and two outside lines. The number of wires to each



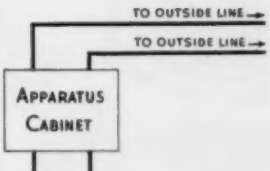


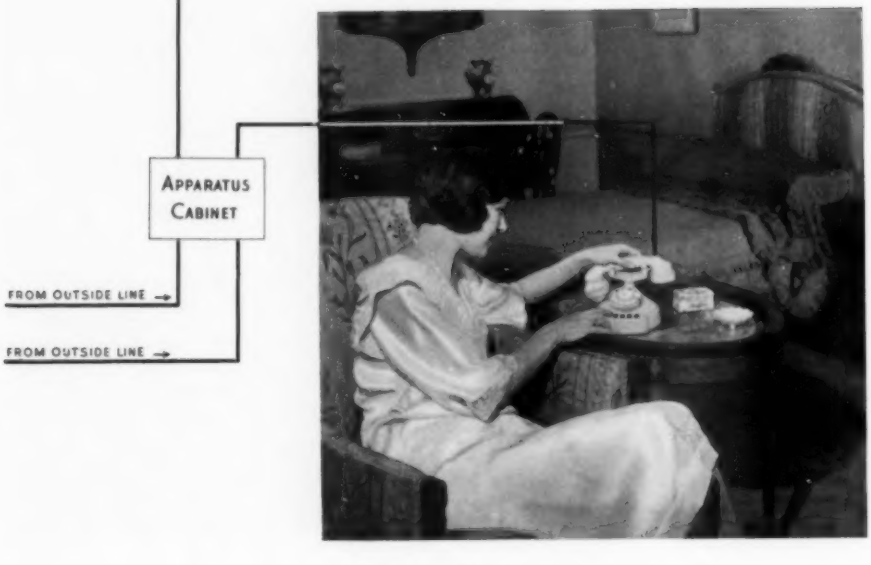
FIGURE 2 (upper). A call from the library.

FIGURE 3 (lower). A call from the kitchen.

OUTGOING CALLS.

FIGURE 4 (upper). The maid answers in her room.

FIGURE 5 (lower). A call answered in privacy.

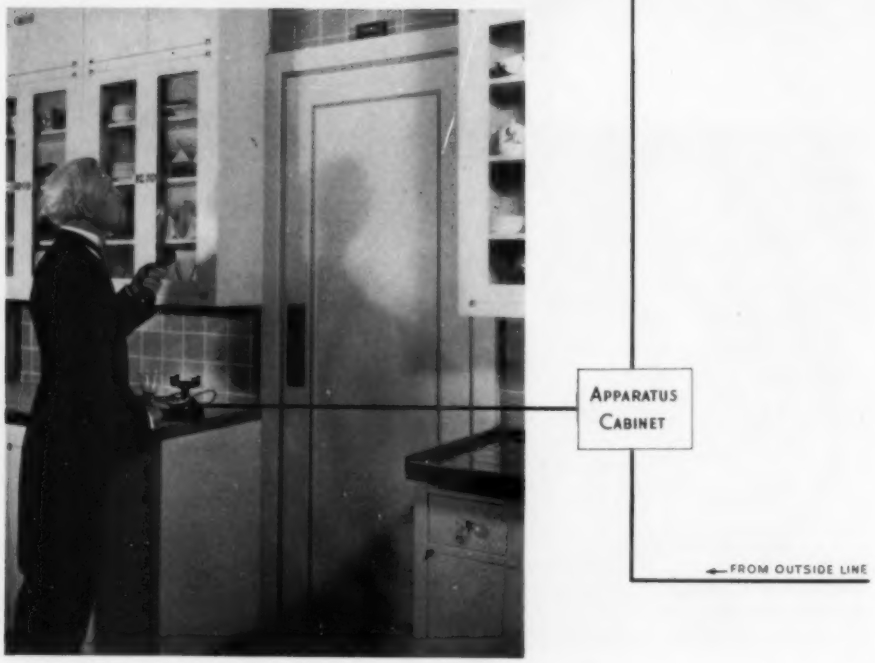


INCOMING CALLS.

FIGURE 6. The maid is asked to call the butler.

AN INTERCOMMUNICATING CALL WITHIN THE RESIDENCE.

FIGURE 7. A call for a guest is transferred to the living-room by the butler, who knows by the colored light which line it came in on.



A CALL RECEIVED AND TRANSFERRED.

telephone has been reduced to a minimum so as to simplify the installation.

Certain of the telephones, as for example those for servants in residences, can be restricted to house calls only or they can be arranged so that incoming calls can be answered and transferred but calls to the outside cannot be made. An outside line can be assigned, if desired, for the use of servants or other employees and the other outside lines reserved for family use.

A novel feature of the telephone instrument is that the push buttons for establishing the outside and intercommunicating connections are included in the instrument as shown in Figure 1. (See *frontis-piece.*) There are five of these push buttons which are distinctively colored and designated 1, 2, 3, H and L. The first three buttons connect the instrument with the outside lines, the "H" button holds the outside connection when a call is received at one telephone and transferred to another telephone, and the "L" button is depressed to make a local intercommunicating call. While ordinarily the hand set type of instrument is used, desk and wall sets with separate push buttons may also be used, if desired, at certain points.

The operation of the 750-A system may be easily understood from the accompanying pictures. Figures 2 and 3 depict the making of outside calls. The user simply depresses a button on the instrument associated with the outside line and then lifts the hand telephone in the ordinary manner. If no busy signal is received, he proceeds to make the telephone call in the usual way, either by giving the call to the telephone company operator or by dialing the number desired.

Figures 4 and 5 represent typical incoming calls. These calls are indicated by the ringing of bells associated with the outside lines. The bells are conveniently located so that they can be heard from all desired points. Incoming calls are answered by depressing push button 1, 2 or 3 associated with the outside line on which the call is being received. Each outside line has associated with it a distinctively toned bell or colored

lamp signal, or both, as may be desired, for indicating the proper button to operate. In the case of the colored lamp signals, the color corresponds to the color of the button on the instrument.

Figure 6 depicts an intercommunicating call within the residence which is established by the calling party depressing the push button "L," lifting the hand telephone and then dialing the number of the telephone desired. If the called telephone is not busy, ringing current is automatically sent over the line and rings the bell at the called telephone. The called party, in answering, depresses the "L" button on his instrument and lifts the hand telephone from the set.

Figure 7 is illustrative of a call which is answered at one telephone but transferred to another telephone. This is done by answering in the usual manner and then depressing the "H" button which operates an arrangement to hold the outside connection. The original answering party then operates his "L" button and dials the number of the telephone desired. When the called party answers and is told about the incoming call, he depresses the button of his set corresponding to the outside line over which the call is being received. This removes the holding condition from the outside line and automatically disconnects the original answering telephone.

Figure 8 illustrates the making of an intercommunicating call as already described except that it shows a call to a point outside the residence, in this case, a call from the residence to the stable.

The 750-A system is equally advantageous for the telephone service of many business concerns. Perhaps the most important feature in connection with the use of this system by business concerns requiring a small number of telephones is the fact that its operation requires no operator or attendant. Thus the subscriber is relieved of the need for providing an employee for telephone service and the problem of relief for the attendant during noon hours and at other times is avoided.

FIGURE 8. The butler calls the groom at the stable.

AN INTERCOMMUNICATING CALL TO A POINT ON THE ESTATE.

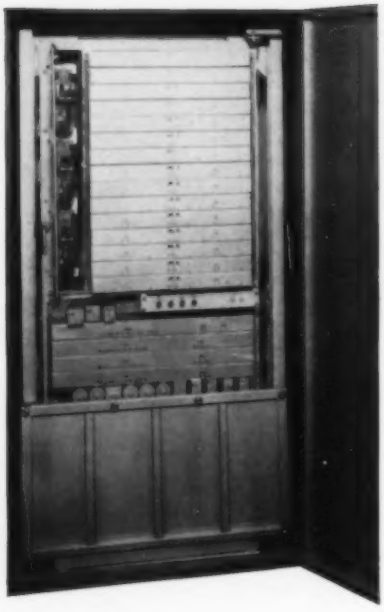


FIGURE 9 (left). This shows the compact arrangement of the apparatus required for the operation of the system.

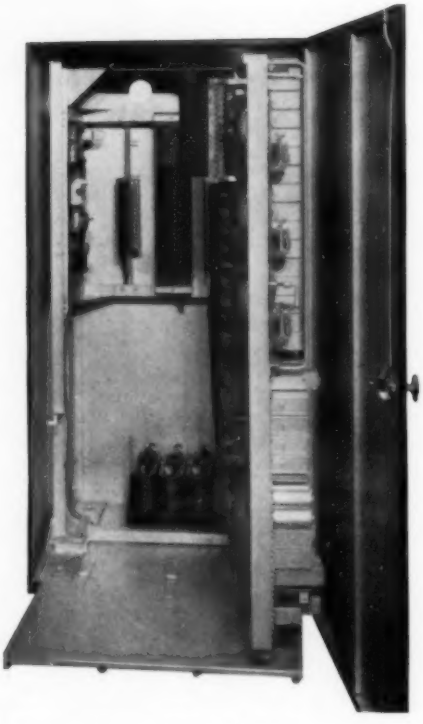


FIGURE 10 (right). This is another view of the apparatus including the power plant.

APPARATUS CABINET FOR THE NEW INTERCOMMUNICATING SYSTEM.

It has been mentioned above that the 750-A system is one that is simple to operate. However, telephone calls cannot be originated, received or switched to other points without the use of relays and other equipment. Figures 9 and 10 illustrate the very compact manner in which all of the apparatus required has been housed in a cabinet, no larger than the ordinary coat closet. The cabinet can be placed in an out of the way and inconspicuous location. The power plant used is self-contained with the switching equipment in the cabinet and is kept in operation automatically, either by current fed over wires from the central exchange or by means of equipment arranged for local charging of the batteries.

C. J. DAVIDSON
A. TRADUP

Significant Features of the Early Census Returns

THE nation's gain in population between 1920 and 1930 was the largest, numerically, ever recorded by the Federal Census. Continental United States on April 1, 1930, was found by government enumerators to have had 122,698,190 people, or 16,987,570 more than the number reported for January 1, 1920. This increase exceeds by more than a million the largest previous gain, that occurring in the period 1900–1910.

No business is more interested in the revelations of the census than is the telephone industry. Its service is so closely identified with commercial and social activities throughout the United States that any marked changes in the size, distribution, and characteristics of the nation-wide market have an important bearing on its development. Operating companies are faced with the problem of engineering their facilities to meet adequately the requirements of new subscribers, and this expansion in exchange service is definitely related to population growth. Likewise, growth in toll usage and in the demand for special contract services are closely associated with the increase in population.

Early reports of the recently completed census have furnished valuable data on population changes in the United States during the past decade. There has been considerable variation in the rate of growth between different sections of the country as well as between different types of communities; and several pronounced tendencies may be observed in the distribution of population throughout the United States. Many of the changes are fundamental in character and far reaching in effect. The time seems opportune to examine the census returns so far available and to note some of the more

important features of special significance to the telephone industry.

The question naturally arises as to how the numerical difference between the 1920 and 1930 census totals attains such an unprecedented level in view of the notable decline in the birth rate since 1920 and the drastic legal restrictions placed upon foreign immigration in the early part of the past decade. The figure of nearly 17,000,000 is 2¼ million in excess of the growth realized during the previous decade, when the net immigration was 25 percent greater and the rate of natural increase some 10 percent higher. Moreover, many individuals have claimed that they were missed by the census enumerators, while some local chambers of commerce have held that the census figures for their communities were too low. This idea of an undercount, instead of adding to the apparent discrepancy between the two censuses, may actually provide an explanation. The 1920 census likewise may have been an undercount—and to a greater degree than the 1930 census. If this be true, a portion of the reported increase in population between the two dates would thus be due to the greater thoroughness of the recent census as compared with the enumeration in 1920.

A variety of factors indicate that the 1930 census may have been taken with greater efficiency than those of 1920, 1910 and 1900, all of which were apparently made on about the same basis. In 1930 the enumerators seem to have been more carefully selected and trained, and they received relatively higher compensation. Greater ease of communication resulting from better rural roads and more extensive telephone service, the policy of having local supervisors make preliminary announcements of census returns from their districts (thus permitting recounts where reasonable doubt regarding the accuracy of the figures seemed to justify them), and a better organization and supervision of the overall undertaking have all apparently played a part in making the enumeration more

closely descriptive of the facts than perhaps had been possible at any previous time. In all probability the increased efficiency was most pronounced in the high density sections of large urban centers where the concentration of the poorer classes in crowded quarters would tend to make complete enumeration difficult, and in sparsely settled rural areas where scattered population might not be readily accessible and therefore might be easily missed. Although no definite correction of any excess of the reported decade increase over actual growth can be made until the detailed tables on age, sex, and nativity are available (so far only preliminary total population figures for states, counties and principal cities have been announced), it is probable that the elimination of the excess would reduce the average annual increase to about the same level as was experienced between 1910 and 1920. This would give a total increase of 13 percent for the decade, as compared with 15 percent from 1910 to 1920 and 21 percent in the previous ten years.

While this decline in rate of growth has been due partly to the diminished stream of immigrants, a more important factor has been the tendency for birth rates to fall much more rapidly than death rates. In 1910 the birth rate was about 30 per 1,000 population and the death rate was 15, while at present the birth rate is very close to 19 and the death rate about 12. Thus, in twenty years the margin which represents natural increase in population has decreased from 15 per 1,000 to 7. The reduction in the death rate has been accomplished almost entirely by reducing the infant mortality, while the rate in middle life and beyond has shown, if anything, a tendency to rise. Factors contributing to the decline in birth rates are generally higher living standards, smaller living quarters, marriages in which both husband and wife are breadwinners, the tightening of immigration restrictions against the prolific races, and finally wider knowledge and utilization of birth control information.

Urbanization of the Population

Since most of the factors tending to lower the birth rate are more prevalent in the cities than in the country, the decrease in the rate is particularly significant in view of the rapid urbanization of population that has taken place in the recent years. The spectacular increase in the number and size of urban centers is indicated by the fact that there are now 941 cities in the United States with over 10,000 population compared with 726 in 1920, and that these cities in the aggregate gained 11,600,000, or 25 percent, between 1920 and 1930, and now contain 47 percent of the total population of the country. Eighty-five of these cities gained over 100 per cent of their 1920 population, while 134 others experienced growths between 50 percent and 100 percent.

Not only have the urban centers gained enormously in population during the past decade, but the rural areas have lost heavily. Whereas in other periods the settlement of new lands resulted in rural gains outbalancing the losses in the older farming districts, since 1920 there has been no extensive frontier development to compensate for the losses elsewhere. During the past ten years the net migration from many areas has exceeded by a considerable amount the large natural increase, and consequently it appears that for the first time in our history the total rural population has actually declined.

Census returns from various districts in all parts of the United States indicate that there is a definite trend away from the smaller towns and the unincorporated areas. Of the 2,200 counties in the country which contain no community of 10,000 or more population, about 1,200 declined between 1920 and 1930. In the majority of the remaining counties the gains were comparatively slight, while in others there were indications of losses in the distinctly rural portions. These early reports tend to substantiate the Department of Agriculture estimate that the last decade has in all probability seen a loss of 4,000,000 people on the farms of the United States.

These movements of rural population may be illustrated by the group of Lake States, including Ohio, Indiana, Illinois, Michigan and Wisconsin. These states have a total of 436 counties, of which 241 lost population during the past decade. Of the losing counties, 220 were predominantly rural and in the aggregate their loss amounted to 8 percent of their 1920 population in addition to their entire natural increase. The 71 other counties with no place of 10,000 or more inhabitants gained only 5 percent since 1920; and of these, 32 were adjacent to counties distinctly urban in character.

The explanation of much of the rural decline is simple. The widespread use of motor-driven machinery and the introduction of scientific farm practices have made it possible for a smaller number of workers to produce a larger output. Increased labor efficiency in other rural industries, such as coal mining where modern drilling and loading machines have been adopted, has released many workers. Additional opportunities for untrained workers in the cities, brought about by the decrease in the foreign labor supply after the drastic restrictions on immigration went into effect and by the unusual growth in the service industries, have been instrumental in accelerating the migration from rural districts, a notable example being the movement of negroes from southern farms to industrial cities. And, finally, there has been a tendency for farmers upon retirement to move to communities with special attractions as resorts or home centers, as contrasted with the former tendency to remain on the farm.

There have been several attempts to minimize the significance of this urbanization process on the basis that it has been the smaller cities, distinctly less urban in character, which have shown the fastest rate of growth. Color is lent to this argument by the fact that some of the most spectacular gains in the country occurred in cities of between 10,000 and 25,000 population. Since 1920, that group of cities has increased in number by 133; it has gained 28 percent in population and

absorbed 11 percent of the total growth of the country. A detailed examination of this group shows, however, that the fastest growing cities are mainly suburban to the largest cities in the country. Their growth, therefore, represents an overflow from the metropolitan centers and may be attributed to the attractions of the most highly urbanized districts.

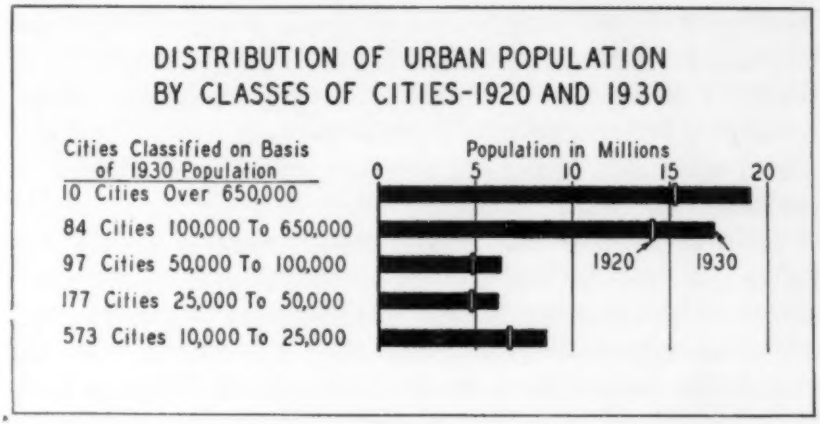


CHART 1

Since 1920, there has been a net increase of 21 in the class of cities having between 50,000 and 100,000 inhabitants and of 35 in the 25,000 to 50,000 group. These two groups each accounted for about 8 percent of the national growth and each increased about 28 percent. Cities with 100,000 or more increased in number from 68 in 1920 to 94 in 1930 and now include about 30 percent of the total population of the country. Between 1920 and 1930 these 94 cities gained about 7,000,000, representing a 24 percent rate of growth and amounting to over 41 percent of the national increase.

The total growth of the largest ten cities in the United States amounted to 3,757,000, an increase at the rate of 24.4 percent —a rate which is 50 percent higher than that for the nation as a whole. This growth occurred in spite of the fact that the increase in cities such as Philadelphia, Boston and Cleveland

was limited by the presence of surrounding communities which they have not yet annexed. If the suburban territory of these ten cities were included, the proportion of the country's growth occurring in their metropolitan areas would be raised approximately from 20 percent to 40 percent. In this connection, it might be observed that numerically New York City registered the largest decennial increase ever recorded by any city in this country, while the metropolitan area, consisting of New York City and its surrounding suburban territory within 40 miles of the city hall, experienced a phenomenal population growth, exceeding by 200,000 the total increase in the State of California, a gain equivalent to one out of every seven persons added to the country's total population.

The magnitude of the urbanization movement is indicated by the growth of the entire group of cities of over 10,000 population, which absorbed 68 percent of the country's total gain; and if the suburban areas of the cities over 50,000 were included, the proportion is raised to 86 percent. These facts are significant as showing the continued growth of the large cities and as proof that much of the rapid gain in the smaller cities was due to their suburban character. One further observation seems pertinent at this point. Since the Census Bureau arbitrarily defines townships, unincorporated towns and all places of less than 2,500 inhabitants as rural, a good deal of the suburban population which is essentially urban in character will appear in official classifications as rural. This classification thus tends to mask the actual rural losses which have occurred in purely rural counties.

Growth of Special Classes of Cities

While the urban districts in general grew rapidly in population during the past decade, the different cities did not share equally in this growth. Some actually lost inhabitants while the increases in the commercial centers, with some outstanding exceptions, were quite moderate. On the other hand, certain

manufacturing cities depending largely upon new and rapidly expanding industries experienced remarkable gains, and the home communities and tourist resorts made notable progress.

Some of the decade's most dramatic population shifts to cities have been caused by the desire for pleasure or for easier ways of living. The improved standard of living in the United States has resulted in an increase in the amount of travel for pleasure, in a greater proportion of young people seeking higher education, in more frequent and earlier retirement, and in the selection by the leisure and retired classes of communities whose chief feature is their attractiveness as home centers.

Widespread automobile ownership, the development of good roads, and an increase in vacationing have all contributed to the development of mountain resorts, such as Asheville and Hot Springs, seashore resorts, such as Atlantic City, and a large number of places having natural scenic beauty or special historical associations. In northern New England and New York and in the Lake States many communities which were faced with losses as their trade or lumbering declined regained their importance as a result of the exploitation of their intrinsic appeals for tourists.

The large number of young people now continuing their education beyond high school and the social and cultural advantages afforded by communities with educational and governmental institutions have caused remarkable gains in many college towns and state capitals. More than half the state capitals grew faster than the national group of cities of corresponding size, while 14 increased by over 50 percent and two more than doubled their 1920 population. It is noteworthy that Washington grew considerably in the last ten years, in spite of the release of many thousands of emergency government workers temporarily employed during the height of war activities.

The mild equable climate of Florida and California has appealed to large numbers of the retired and leisure classes

whose choice of a home community is based on the play motive rather than the work motive. Consequently, such cities as Miami and Los Angeles have received heavy migrations of this element in addition to the tourist class.

Another group of cities in which there were some considerable gains includes those cities dependent mainly upon a single large industry for whose product there has been an expanding market. Cities like Detroit and South Bend, Akron and Tulsa, representing automobiles, rubber and oil, each have specific reasons for their growth and prosperity. And the newer the commodity produced, the more rapid the growth.

Generally speaking, commercial cities grew only moderately but there were a few conspicuous exceptions. Cities like Charlotte, Chattanooga, Oklahoma City, Houston and Dallas, located in areas which experienced considerable economic improvement during the past decade, profited by the increased purchasing power of their trade territories. The greater prosperity of the three southwestern cities just mentioned was due partly to the development of the oil industry and partly to the substitution of field crops for grazing.

In marked contrast to the almost universal urban growth throughout the country, there were a few cities that recorded losses of population during the last ten years due to the outward migration of workers seeking employment elsewhere. This was especially true of the textile and shoe cities of New England—Manchester, New Bedford, Fall River, Lawrence, Lowell, Brockton and Haverhill—which all suffered considerable declines due to the removal of many of their mills to other areas. Certain coastal cities which had large numbers of workers engaged in war-time activities also have lost population. This is because the 1920 census was taken before the deflation from boom conditions really became effective, and the population in these cities naturally declined after the emergency passed. This was particularly true in Hoboken and Hampton Roads, centers of shipping and shipbuilding during

the war, and in Bridgeport and Wilmington, where large quantities of munitions were manufactured. Thus, people moved not only from rural to urban districts but also between cities and from one industry to another, according to the relative opportunities for employment.

However, there were some cities, starting as boom towns in certain industries, which retained their early growth and made substantial gains after the impetus of the initial stimulus subsided. During the boom period these cities, of which Wichita Falls and Shreveport are good examples, were also developing permanent commercial activities which have since enabled them to maintain their lead over longer established cities.

Geographical Distribution of Population

As might be expected from the extensive rural losses and the irregular urban gains, the population growth of the United States between 1920 and 1930 was very unevenly distributed among the several sections of the country. In general, the large and populous states recorded the most gain, while those devoted chiefly to farming showed the least. This is strikingly illustrated by the figures for the largest ten states—New York, Pennsylvania, Illinois, Ohio, Texas, California, Michigan, Massachusetts, New Jersey and Missouri. During the last ten years those states gained 11,225,000 or about two-thirds of the total population increase for the entire country, and they now contain over half the people of the nation. On the whole, the principal factors that influenced the distribution of population throughout the country were industrial expansion, the development of oil fields, and the attraction of a favorable climate, and the heaviest gains occurred where these economic considerations predominated.

It may be interesting to consider the significance of changing regional trends of population distribution by broad areas. Discarding the Mississippi as an arbitrary boundary between the East and the West, and dividing the country according to

traditional lines into North, South and West, the ten years' gains were 15 percent, 13.5 percent and 33.4 percent, respectively. Thus it would appear that, in one sense, the West —the Rocky Mountain and Pacific Coast states—is still the fastest growing section. But the numerical increases tell a different story: North, 9,337,000; South, 4,668,000; West,

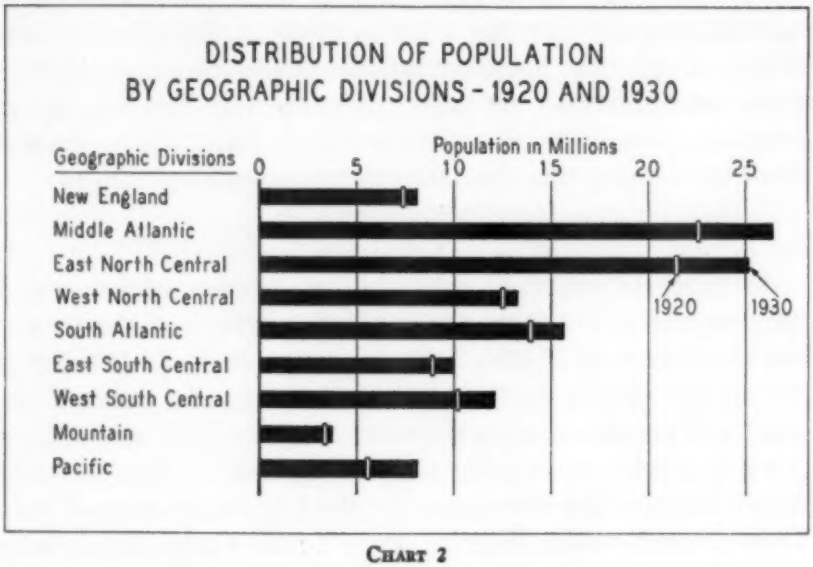


CHART 2

2,982,000. These rates of growth were far from uniform in the major geographical divisions of these three regions. In the North, the industrial belt including New York, New Jersey, Pennsylvania and the Lake States increased by nearly 7,800,000 or 17.8 percent, while New England, experiencing a severe textile depression, grew by 10.4 percent and the grain states of the West North Central division—Minnesota, Iowa, the Dakotas, Nebraska and Kansas—had the smallest rate of growth in the country, only 5.8 percent. In the South, the discovery of oil and the expansion of agricultural operations in Texas, Oklahoma and Louisiana contributed toward a population growth of 21.4 percent in this group of states, while the

remainder of the region, suffering from heavy migration losses in most states, gained at a rate of only 10 percent, and this increase may be high because the efficiency of the 1930 census was probably especially effective in states so distinctly rural in character. In the West, the Pacific states, favored by the exploitation of California's climate and oil deposits, enjoyed a growth of 2,610,000 or 47 percent, while in contrast the Mountain states increased by only 11 percent.

Turning to population growth by individual states, some remarkable gains are found. More than one-quarter of the total increase in the United States was concentrated in two states—California, in the Far West, with an increase of 2,245,148, and New York, in the East, with a growth of 2,234,276. Three other states—Michigan, Texas and Illinois—each account for more than 1,100,000 of the increase. Pennsylvania gained more than 900,000, and Ohio and New Jersey each gained more than 870,000. The real estate boom in Florida, capitalizing its exceptional climate, and the pronounced industrial development in North Carolina brought about impressive population gains in these two southern states. The importance of these ten states and their influence upon the distribution of population can be realized better when it is noted that this group of states, which had 47 percent of the national total in 1920, accounted for 70 percent of the past decade's increase.

In conclusion, the most significant tendencies indicated by the 1930 census are the slowing down in the national rate of growth and the tremendous shift of population from rural to urban districts. It is quite evident that the increase in the mobility of the American people has been much faster than the growth of population. Migrations, motivated by various causes and objectives, have occurred in volume and with rapidity during the past decade, and the changing trends in the regional distribution of population have much significance because they indicate a decline in the relative importance of

rural industries, especially agriculture, and the increasing opportunities in the cities. The rapid growth of resorts and urban centers having special attractions to the tourist and retired classes is alone sufficient to show that there has been a general improvement in economic conditions in the United States during the last ten years with a consequent increase in purchasing power and a higher standard of living.

All these developments have a bearing upon the market for telephone service; and a consideration of these population changes is important to the telephone industry. The continued drift of population to the cities means an increasing demand for water, sewers, educational and recreational facilities, matters which bear directly upon the health and social welfare of the community. In the endeavor of public utility companies to render satisfactory service under conditions of rapid urban growth, their engineers are being faced with the serious problem of providing promptly adequate plant and distribution facilities.

Some of the conclusions based upon the preliminary reports of the 1930 census may be modified slightly as additional results are published. No doubt, too, the added data, especially that on occupations and on age, sex and nativity characteristics, will reveal other trends of significance to the telephone industry.

R. L. TOMBLEN

Notes on Recent Occurrences

MORE TELEPHONES IN MEXICO AND IN EUROPE CONNECTED WITH THE BELL SYSTEM

A SECOND telephone network in Mexico was brought within reach of Bell System telephones and Canadian telephones on June 12 when service was extended to the stations of the Ericsson Telephone Company in the southern republic. This system covers some 40 cities and towns in the eastern section of Mexico from the Rio Grande to the vicinity of Mexico City. This new extension brings the total of interconnected telephones in North America to over 21,000,000. The Ericsson Company has approximately 25,000 stations in Mexico City and several thousand additional throughout the rest of Mexico. To inaugurate the service, officials of the Mexican government in Mexico City talked with Mexican diplomatic representatives at Washington. Officials of a Canadian bank's branch in Mexico City conversed with the Montreal headquarters. Following these conversations Vice President T. G. Miller of the American Telephone and Telegraph Company, in New York, spoke with General Manager B. Wahlqvist of the Ericsson Telephone Company, in Mexico City.

On June 30, the transatlantic telephone service was extended to include all telephones in Sweden. Previously the overseas service to Sweden was limited to the three cities of Stockholm, Gothenburg and Malmo.

With this new "farthest north" established, the Bell System radio-telephone service connects with an area extending from within the Arctic Circle, in Europe, to nearly the fortieth parallel of south latitude in South America. The new Swedish extension will make possible a call from the United States covering an extreme distance of about 9900 miles. The cost of a

three-minute conversation to any point in Sweden will be the same as for Stockholm, $36.75, with $12.25 for each additional minute.

On July 5, the transatlantic telephone service was extended to the State of Vatican City, residence of the Pope. This is a further extension of America's overseas connections in Italy, service being already available to all of Northern Italy and to the city of Rome. As in the case of other transatlantic points, the service is open to all of the United States and Cuba and to the principal cities of Canada and Mexico. The cost of a call between New York and Vatican City is $36.00 for the first three minutes and $12.00 for each additional minute.

Another Baltic state was made accessible to the United States by telephone on July 16, when Lithuania was added to the European nations connected with North America by the overseas service. The transatlantic talking zone was extended on that day to include the cities of Memel and Kovno. The cost of a three-minute call from New York to either of these cities is $35.25, with $11.75 for each additional minute. The service is available throughout the twenty-four hours. Memel is the seaport of Lithuania and Kovno its temporary capital. They have a combined population of about 250,000, with some 9,000 telephones.

A. T. & T. CO. TO ERECT SHORT WAVE STATION FOR SERVICE TO HAWAII AND ULTIMATELY TO THE FAR EAST

AS an initial step in its program of extending transoceanic telephone service into the Pacific region, the American Telephone and Telegraph Company has applied for a construction permit to erect a short wave radio-telephone station in California. This station is designed to connect the United States with various countries bordering the Pacific, and its island groups, as radio telephone stations are equipped in the

distant countries. As the demand for the service develops, Bell System telephones will be connected with one after another of the Far Eastern nations through a combination of land wires and short-wave radio transmission.

As now planned, the first regular service will be provided to the island of Oahu, in the Hawaiian group. By 1932 it is expected that all subscribers of the Mutual Telephone Company of Honolulu on the island will be within voice range of United States telephones. Preliminary arrangements have been made in a series of conferences between Vice President T. G. Miller, of the American Telephone and Telegraph Company, and President J. A. Balch of the Mutual Telephone Company, who journeyed to New York City for this purpose.

Telephone administrations of other countries in the Pacific area have likewise expressed an interest in the proposed service. In time it is probable that direct telephone connections will be established with Australia, Japan and others of the more important far-eastern nations.

This telephone pioneering into the Pacific region is part of the Bell System's general program of providing telephone connection for its subscribers with all points for which the demand warrants the service.

In the original charter of the American Telephone and Telegraph Company, granted in 1885, occurs this paragraph:

"And it is further declared and certified that the general route of the lines of this association" (the American Telephone and Telegraph Company), "in addition to those hereinbefore described or designated, will connect one or more points in each and every city, town or place in said state and in each and every other of the United States and in Canada and Mexico; and each and every of said cities, towns and places is to be connected with each and every other city, town or place in said states and countries; and also by cable and other appropriate means with the rest of the known world. . . ."

At that time the longest long distance line was 240 miles,

there were no telephone cables and the "other appropriate means" referred to for reaching overseas did not exist. Yet the vision accurately outlined what has happened since. At present any of the 21,000,000 Bell and Bell connected telephones in this country may be connected directly with practically all important points in Western Europe, in Argentina and Chile and the city of Montevideo, Uruguay. The radio telephone service also extends to four ocean liners—the Leviathan, Majestic, Olympic and Homeric—while at sea. The proposed radio-link to Hawaii will extend the talking range from the United States 2,100 miles westward. It will make possible a conversation between Honolulu and a point in Maine, for example, covering a distance of almost 6,000 miles.

For some time past American Telephone and Telegraph Company and Bell Laboratories' engineers have been investigating various sites on the West Coast to determine the best locations for the new radio stations. Several possibilities are under consideration and field strength tests are being conducted to select those which prove most suitable for the transmitting and receiving stations. Once the question of location is settled, the work of erecting and equipping the two stations will go forward rapidly. The construction cost, including purchase of land, manufacture of apparatus, erection of buildings and radio towers and installation of equipment, will reach a total of over $1,000,000.

At the outset the American Telephone and Telegraph Company is planning an installation which will enable the company to give service simultaneously to Hawaii and at least one of the other points in the Pacific region.

TO BUILD NEW LABORATORY IN N. J.

A NEW laboratory will shortly be erected by Bell Telephone Laboratories in Murray Hill, N. J. Property to the extent of 200 acres has been assembled in the block bounded by

Mountain Avenue, Glenside Road, Glenside Avenue, and Diamond Hill Road, in the Borough and Township of New Providence. The principal frontage is along Mountain Avenue. Adjoining the Watchung Reservation on one side, the property extends to within about half a mile of the Murray Hill railroad station on the other.

It is proposed to establish on this site a laboratory for many of the problems in communication which can best be studied in the quiet atmosphere of the suburbs. Buildings as they are gradually erected will be of moderate height, and their architecture, as well as the landscaping, will not be out of harmony with the residential character of the neighborhood. No commercial manufacturing is proposed. Final decisions have not been made as to the first groups of scientists who will work there, but it is expected that plans will progress far enough to allow ground to be broken in the autumn.

W. ALDRICH MADE A. T. & T. DIRECTOR

AT the meeting of the Directors of the American Telephone and Telegraph Company on August 20, Winthrop W. Aldrich was elected a director.

W. Cameron Forbes, who recently became ambassador to Japan, resigned as a director.

A. T. & T. CO. BUYS TELETYPE CORPORATION

THE American Telephone and Telegraph Company has purchased the Teletype Corporation by an exchange of 150,000 shares of the common stock of the two corporations, share for share. The purchase became effective October 1, 1930.

The Teletype Corporation's principal office and factory are in Chicago and it is engaged in the manufacture of printing telegraph equipment of all kinds. The Bell System for years has been the company's largest customer.

A survey of the Bell System's future needs for this type of apparatus indicates that it will continue to require a major portion of Teletype's production. Therefore, it seemed desirable to acquire Teletype in order to realize the maximum of progress and economy through the complete co-ordination of research, development and manufacture.

The Teletype Corporation will be operated as a subsidiary of the Western Electric Company.

MEDAL AND AWARD ESTABLISHED BY THE A. T. & T. CO. IN HONOR OF GENERAL JOHN J. CARTY

THE National Academy of Sciences has accepted a trust fund of $25,000 presented by the American Telephone and Telegraph Company for the establishment of a medal and award to be known as "The John J. Carty Medal and Award for the Advancement of Science." This gift has been made by the Company in recognition of "the distinguished achievements of John J. Carty as a scientist and engineer, his noteworthy contributions to the advancement of fundamental and applied science" and in appreciation of "his great service for many years in developing the art of electrical communication." It is to be "a lasting testimonial of the love and the esteem in which he is held by his many thousand associates in the Bell System."

It is planned that this medal, together with a grant of money from the accumulated interest on the fund, will be awarded not oftener than once in two years to an individual selected by the Academy "for noteworthy and distinguished accomplishment in any field of science coming within the scope of the charter of the National Academy of Sciences." The field covered in the award of this honor is very broad, inasmuch as the National Academy of Sciences, incorporated by act of Congress approved by President Lincoln in 1863, may be called upon to "investigate, examine, experiment and report upon any subject of science or art."

The medal and award may be given either for "specific accomplishment in some field of science" or "for general service in the advancement of fundamental and applied science." It is to be given without regard to race, nationality or creed.

Participating with the American Telephone and Telegraph Company in the creation of this new honor is a group of Bell System officials who have been the close associates of General Carty in the administration of the American Telephone and Telegraph Company during the last years of his active connection with it, and who are personally providing funds for the design of the medal, the permanent dies from which medals awarded by the Academy can be struck, and the cost of the first medal awarded. The design of the medal is to be the work of an eminent American medalist.